USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

Report on

LEAK DETECTION AND REPAIR OF EQUIPMENT IN BENZENE SERVICE FOR THE PERIOD JULY 1993 THROUGH DECEMBER 1993

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LEAK DETECTION AND REPAIR OF EQUIPMENT IN BENZENE SERVICE FOR THE PERIOD JULY 1993 THROUGH DECEMBER 1993

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1.0 INTRODUCTION

As required by Code of Federal Regulations, Title 40, Part 61 (40 CFR 61), Subpart L (National Emission Standard for Benzene Emissions from Coke By-Product Recovery Plants, Subpart V (National Emission Standard for Equipment Leaks [Fugitive Emissions Sources]), and Subpart FF (National Emission Standard for Benzene Waste Operations), leak detection and repair of equipment in benzene service and benzene waste service was conducted at the USS Clairton Works facility located in Clairton, Pennsylvania. This report summarizes the results of the monitoring activities for the period July 1993 through December 1993 and includes updates on process component changes and leak records of equipment in benzene service at USS Clairton Works. All monitoring and reporting activities were completed by Chester Environmental.

Equipment "in benzene service" is defined as that equipment which contains or contacts a fluid (liquid or gas) that is at least 10 percent benzene by weight or an exhauster that contains or contacts a fluid (liquid or gas) at least 1 percent benzene by weight. The following four streams at USS Clairton Works meet the requirements of this regulation:

- **Raw gas** is greater than 1 percent benzene by weight and is present in the axi compressors (USS Clairton Works does not use exhausters)

- **Sub gas** is greater than 10 percent benzene by weight and contacts the main regenerators, sub gas vacuum machines (dual axes), sub gas coolers, sub gas separators, and light oil regenerators

- **Sub sub (sub squared) gas** is greater than 10 percent benzene and contacts light oil regenerators, sub gas coolers, and separators

- **Light oil** contains greater than 10 percent benzene by weight, and contacts all separators, coolers, decanters, and transfer line to Aristech. Light oil is also used to wash screens in final cooler and to periodically wash both main and light oil regenerators.

As required by 40 CFR 61 Subpart FF, the emergency contaminated water holding tanks and associated vent system at USS Clairton Works came under this program in August 1992. This Subpart provides a benzene leak definition from closed vent systems and storage tanks, and sets recovery efficiencies of control systems.

2.0 METHODOLOGIES

Summaries of the record keeping requirements, leak detection monitoring requirements, and initial and subsequent semiannual reporting requirements pertaining to 40 CFR 61, Subparts J and V can be found in Appendix A. Specific aspects of these requirements are described below.

2.1 Identification of Equipment in Benzene Service

Inasmuch as the operation of the by-product processes require continual process piping maintenance which may involve physical changes in the processes, the program requires a thorough review of the operations to ensure that all equipment in benzene service is recognized and monitored. Appendix B contains a complete up-to-date listing of the components in benzene service. The tables in this appendix also provide a list which refers to line schematics on which the components are depicted. The revised indices of drawings and any new or revised drawings are included in Appendix C. The indices of the drawings include a summary of the components in benzene service and revision dates of piping diagrams.

2.2 Monitoring of Equipment in Benzene Service

Monitoring of equipment in benzene service was performed in accordance with EPA Stationary Source Sampling Method 21, Determination of Volatile Organic Compound Leaks. This method describes the selection and calibration of monitoring equipment as well as procedures used in the actual monitoring.

A Thermo Environmental Instruments, Inc. Model A-580S Intrinsically Safe Organic Vapor Meter was used for monitoring. The unit is equipped with a photoionization

detector (PID) and an 11.8 eV source. It requires no fuel or other gases to operate. A gas standard containing approximately 10,000 ppmv hexane in nitrogen was used for instrument calibration. Other concentration standards were prepared by diluting the hexane gas standard with known volumes of air. Three-point calibrations were conducted at the beginning of each day of monitoring and a one-point verification was conducted at the end of the monitoring day.

All accessible components were monitored on a monthly, quarterly, semiannual, or annual basis as required by the applicable Subparts (at the request of USS Clairton Works, the alternative monitoring plans described in these Subparts are not followed). It should be noted that many major components, such as Axi Compressors, regenerators, and final coolers, are not in service at all times due to intermittent use. Monitoring of these components is carried out only if the equipment is in service at the time of monitoring. A record of equipment in service at each operating location during monitoring trips is included in Appendix B.

Depending on the particular piece of equipment monitored, a leak is defined, in general, as any emission which results in a monitor reading greater than or equal to either 500 ppmv or 10,000 ppmv (as hexane), or any visible leak. Any leaking components must have the initial repair attempted within 5 days of the determination; final repairs must be completed within 15 days of the determination.

3.0 RESULTS

For the period July 1993 through December 1993, 19 components in benzene service were found to be leaking. The leaking components have been summarized in Table 1. The monitoring log sheets and calibration data can be found in Appendix D.

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TABLE 1

SUMMARY OF LEAKING COMPONENTS

JULY 1993 THROUGH DECEMBER 1993

GROUP	TAG	CONTROL ROOM	USX ID	FIGURE	TYPE EQUIPMENT	DESCRIPTION	FIRST DATE	FIRST PPM	SECOND DATE	SECOND PPM
F	450			83	S CARNON DRUM	SOUTH CARBON ABSORBER VENT LIMIT 200 PPM	07-Dec-93	200, 50%		
F	451			83	N CARBON DRUM	NORTH CARBON ADSORBER VENT LIMIT 200 PPM	14-Jul-93	> 500; 98%		
F	475		SOUTH TANK	80	WAST WATER TANK	TOP S WASTE WATER TANK RELIEF TO CONTROL	28-Sep-93	>10000		
F	477		CENTER TAN	81	WAST WATER TANK	VENT SYSTEM VALVE TOP OF TANK	07-Dec-93	2200		
F	479		NORTH TANK	82	WAST WATER TANK	RELIEF TO CARBON DRUM	07-Dec-93	> 1000		
F	526		CENTER TAN	81	WAST WATER TANK	7 O'CLOCK RELIEF	23-Sep-93	>10000		
F	549		NORTH TANK	82	WAST WATER TANK	9 O'CLOCK RELIEF	14-Jul-93	> 500		
F	550		NORTH TANK	82	WAST WATER TANK	N WASTE WATER TANK MANWAY	07-Dec-93	> 1000		
B	004	1	FICV 2064	19	LO CONTROL VALVE	LO FROM CONTROL ROOM 2 CONTROL VALVE	15-Jul-93	> 10000		
B	086	1	D-202	19	LO DECANTER	RELIEF VALVE	15-Jul-93	> 500		
B	117	1	T-201	20	FINAL COOLER	GROUND LEVEL VENT EQUALIZER VALVE	22-Dec-93	> 10000		
D	381	2	QUAD 7	79	MAIN QUAD	MAIN LO OVERFLOW BLOCKING VALVE	28-Sep-93	> 10000		
D	428	2	B 426	65	TRANSFER LINE	LO/METHANOL TRANSFER TO B LOWDOWN TANK	27-Sep-93	>10000 V		
D	770	2	C4749	46	TRANSDUCER	C4749 BOTTOM PRESSURE R 407C	27-Sep-93	> 10000 V O		
E	064	2	V-504A2	53	LO REGENERATOR	R-582 LOADING VALVE	28-Sep-93	> 10000	23-Dec-93	3000
E	123	2	V-504-D2	56	LO REGENERATER	R 590 LOADING VALVE	22-Dec-93	>10000		
E	215	2	E-638	50	COOLER	OUTLET CLEANOUT	22-Dec-93	> 10000		
E	255	2	E-633	48	COOLER	INLET CLEANOUT VALVE	22-Dec-93	> 10000		
E	264	2	E-640	59	HEAT EXCHANGER	GAS INLET CLEANOUT	01-Oct-93	2000		
E	285	2	D-605	2	LO DECANTER	CLEANOUT VALVE AFTER RELIEF VALVE	01-Oct-93	>1000 V	22-Dec-93	> 10000 V O
E	293	2	E-639	59	WATER COOLER	SUB SUB GAS WATER COOLER OUT CLEANOUT	22-Dec-93	> 10000		
F	203	2	D-624	62	SEPERATOR	CONTROL VALVE FEED TO DECANTER	22-Dec-93	> 500		
F	212	2	D-600	58	SEPERATOR	DRAIN CONTROL VALVE TO DECANTER	22-Dec-93	> 1200		
F	508		SOUTH TANK	80	WAST WATER TANK	5 O'CLOCK RELIEF	07-Dec-93	>10000 V		

V= VISIBLE LEAK

O=LEAK DETECTED BY ODOR

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